

DATE :Sep . 27 . 2003

CUSTOMER: First International Computer, INC.

APPROVAL SHEET

MODEL	MH47
DESCRIPTION	Dual Band PIFA Antenna For Wireless Antenna
SUPPLIER P/N	D05004001301
CUSTOMER P/N	21-92232-02
FILE P/N	

FAVORTRON			Customer	
Manager	Supervisor	Engineer		



惠貿電子股份有限公司
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1. Antenna Spec. For WLAN

1. 802.11b Spec.

- a. Frequency : 2.4 ~ 2.5GHz (Nominal)
range
- b. Impedance : 50Ω
- c. LCD Panel : Open (100°) / Close (0°).
- d. System Plane : XY plane
- e. VSWR : ≤ 2 (Main & Aux. Antenna)
- f. Return Loss : ≤ -10dB (Main & Aux. Antenna)
- g. Band Width : ≥ 130MHz (2450MHz±65MHz at least).
- h. Diversity Sum : ≥ -2.5dBi
- i. **Any 30° angle range can't has null depth.**
- j. **Average gain & Peak gain**

	Peak Gain (dBi)			Average Gain (dBi)		
	Frequency			Frequency		
Antenna	2.4GHz	2.45GHz	2.5GHz	2.4GHz	2.45GHz	2.5GHz
Main	≤ 3	≤ 3	≤ 3	≥ -4	≥ -4	≥ -4
Auxiliary	≤ 3	≤ 3	≤ 3	≥ -4.5	≥ -4.5	≥ -4.5

2. 802.11a Spec.

- a. Frequency : 5.15 ~ 5.35GHz (Nominal)
range
- b. Impedance : 50Ω
- c. LCD Panel : Open (100°) / Close (0°).
- d. System Plane : XY plane
- e. VSWR : ≤ 2 (Main & Aux. Antenna)
- f. Return Loss : ≤ -10dB (Main & Aux. Antenna)
- g. Band Width : ≥ 250MHz (5250MHz±125MHz at least).
- h. Diversity Sum : ≥ -3.5dBi
- i. **Any 30° angle range can't has null depth.**
- j. **Average gain & Peak gain**

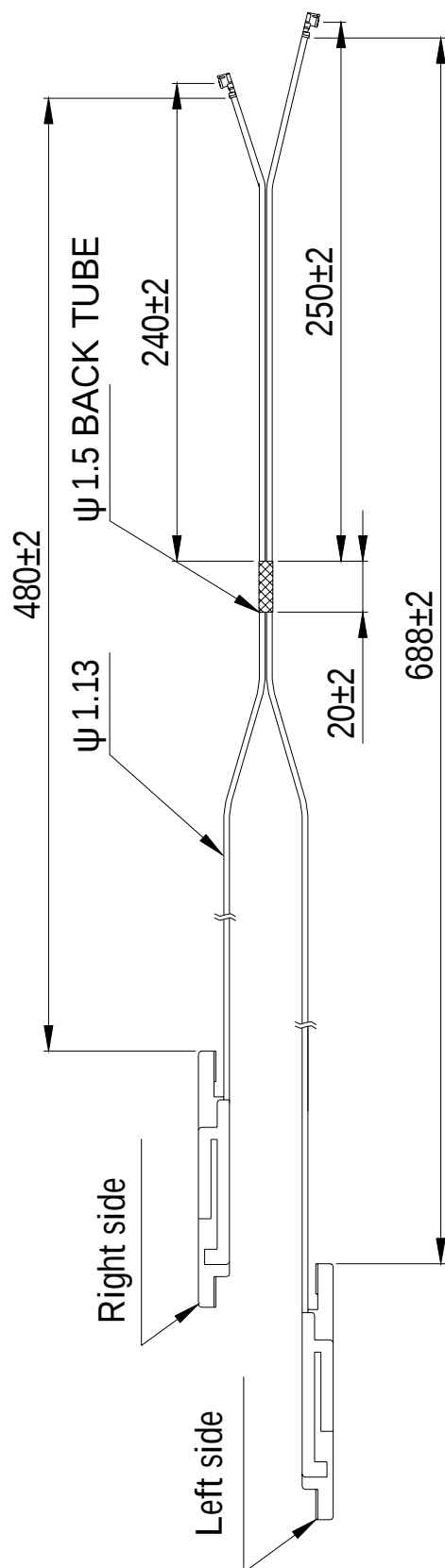
	Peak Gain (dBi)			Average Gain (dBi)		
	Frequency			Frequency		
Antenna	5.15GHz	5.25GHz	5.35GHz	5.15GHz	5.25GHz	5.35GHz
Main	≤ 6	≤ 6	≤ 6	≥ -4.8	≥ -4.8	≥ -4.8
Auxiliary	≤ 6	≤ 6	≤ 6	≥ -4.8	≥ -4.8	≥ -4.8

2. DESCRIPTION

- a. FIC Project Name & FIC P/N : MH47 & 21-92232-02
& Frequency : Daul Band 2.4~2.5 & 5.15~5.35 GHz
- b. Vendor's antenna P/N : D05004001301
- c. Antenna P/N & type & material : G02007072001(L), G02007071001(R)
PIFA & Tinplate
- d. Coaxial cable length & diameter(Φ) : 688mm(Left,Gray) /
480mm(Right,Black) & 1.13Φ
& Cable P/N & Vendor : P/N:FWS5022 & Kurabe
- e. Connector model no. & vendor : P/N:20278-111R-13/1.13Φ & I-PEX

3. DRAWING

3.1 ASSEMBLY



NOTES表面處理：鍍錫

1. 材質：馬口鐵T=0.3mm CRS-DR9
2. 未標示公差為0.1mm, R=0.1mm.
3. 產品表面不得有毛邊，凹陷，刮痕，油漬，翹曲等不良現象

ITEM	DISCRIPION
1	
2	
3	
4	
5	

備註	※未標註公差處，請參照下列標準。				 惠寶電子股份有限公司 FAVORTRON CO.,LTD.				
	TITLE: 大眾-MH47-ASSEMBLY								
發行	RANGE	TOLERANCE		PART NO.	D050004001301				
		Over 101	±1.5	DRAW NO.	TD-E-20851-A1				
		51-100	±1.0	Customer No.	21-92232-02				
		31-50	±0.3	Customer REV.	A1				
	30 Below		±0.2	APPROVAL	DESIGNED		DRAWED		
	Units	mm	Rev.	A0	JEFF	ROCK	ROCK		
	Size	A4	Scale	1:1					
	Sheet	1/1							

3.2 BOM

B O M

ITEM	COMPONENT	Q'TY	DESCRIPTION	FVC P/N	VENDER
1	PIFA ANTENNA	1	MH47-PIFA-LEFT	G02007072001	
2	PIFA ANTENNA	1	MH47-PIFA-RIGHT	G02007071001	
3	同軸線	1	Kurape ψ1.13 x 720mm單邊加 I-PEX Connector(灰色)	G04007182001	
4	同軸線	1	Kurape ψ1.13 x 510mm單邊加 I-PEX Connector(黑色)	G04007183001	
5	SPONGE	2	4 x 2.5 x 3.7 mm	G01009043002	
6	熱縮套管	1	ψ1.5 x 21 mm(黑色)	B02009259032	
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20					

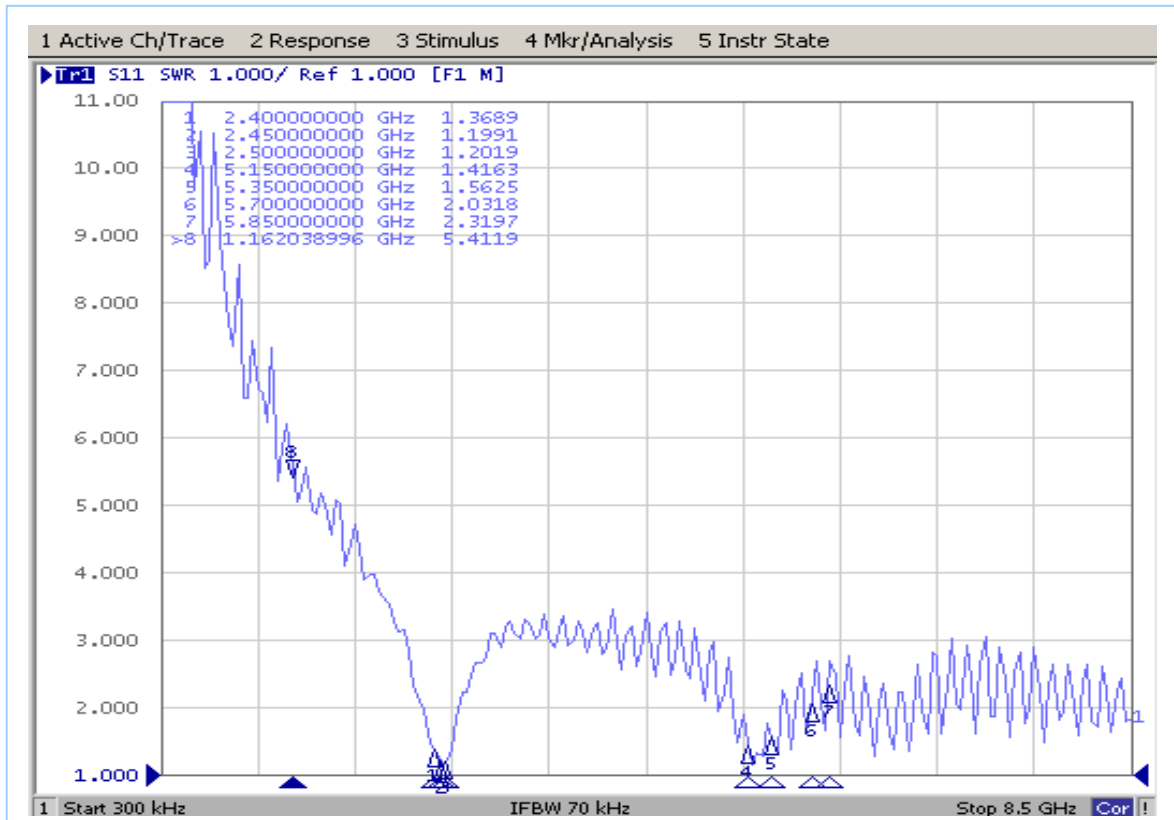
惠賢電子股份有限公司
FAVORTRON CO.,LTD

Title: 大眾MB06L

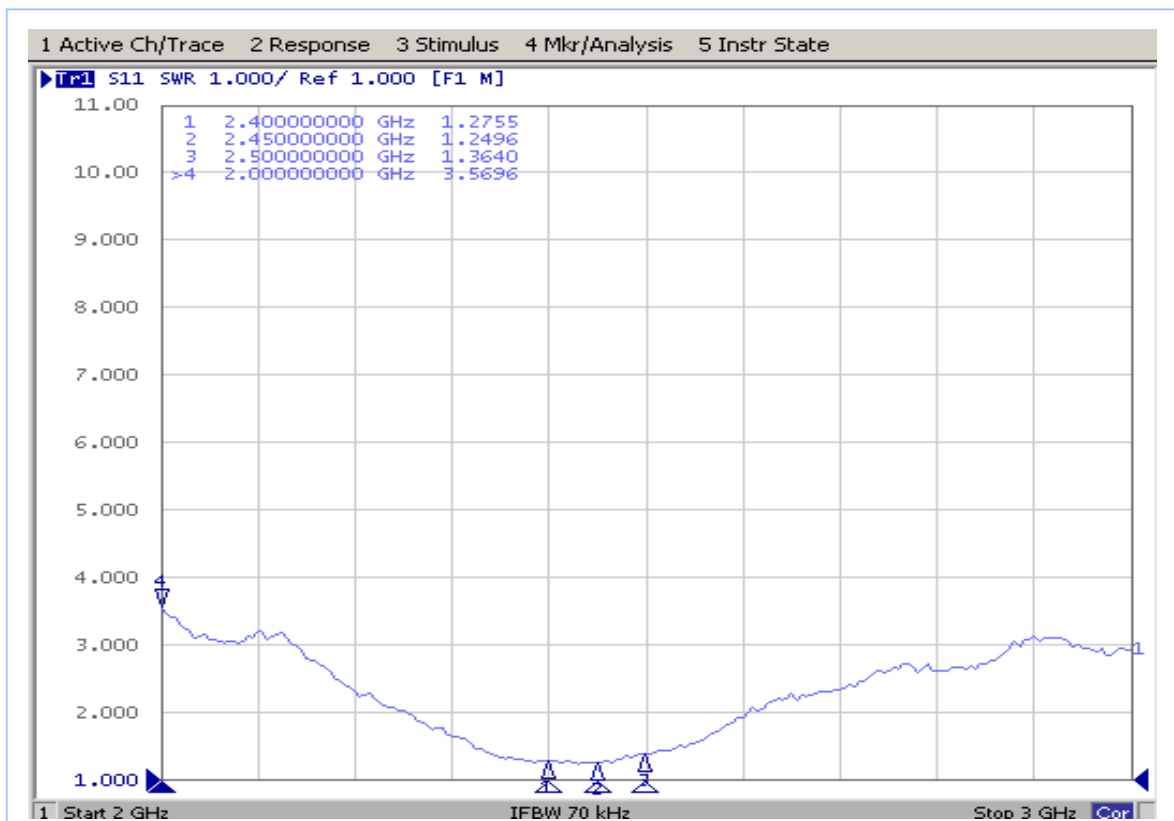
FVC Part No.	D05004001301	
FVC Draw NO.	TD-E-20851-A1	
CUS. Part NO.	21-92232-02	
Approval	Check	Designed
JEFF	JERRY	ROCK

4. PIFA W/L ANT. / LCD TOP Left / 688mm / I-PEX & Kurabe / Gray

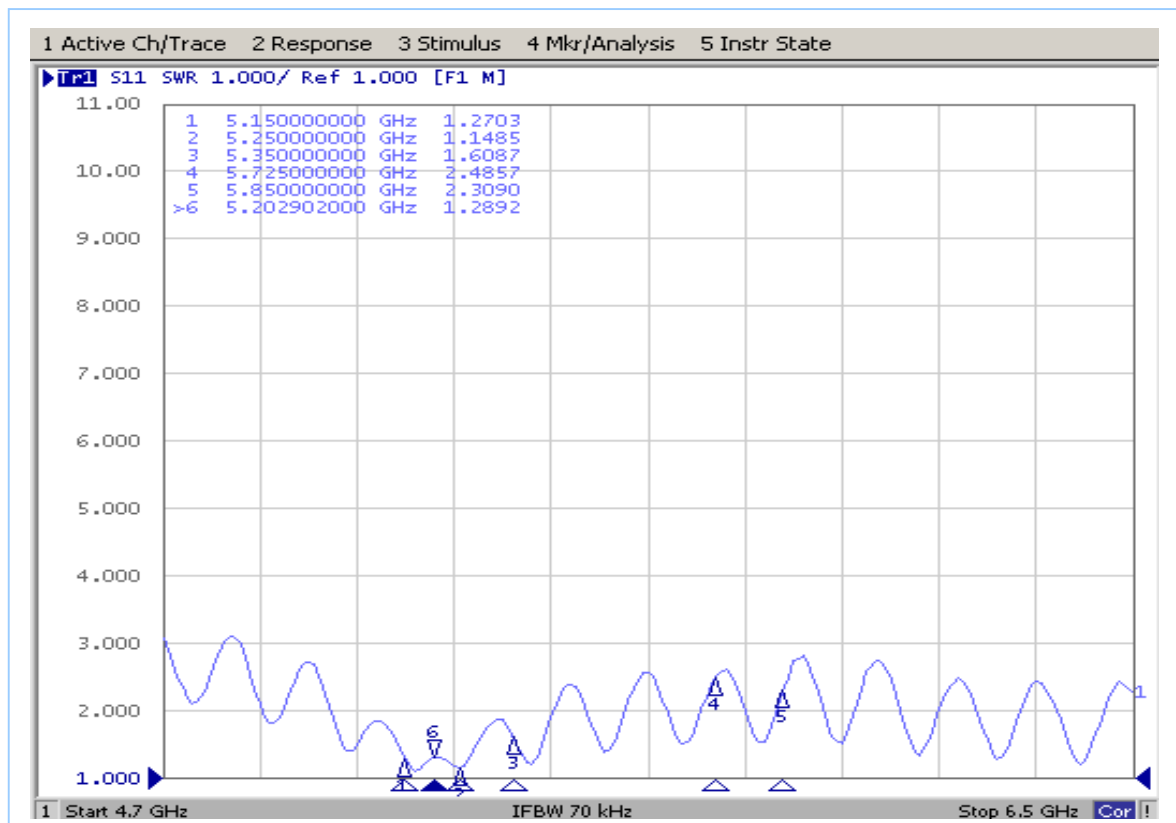
4.1 VSWR (2.4~2.5GHz & 5.15~5.35GHz)



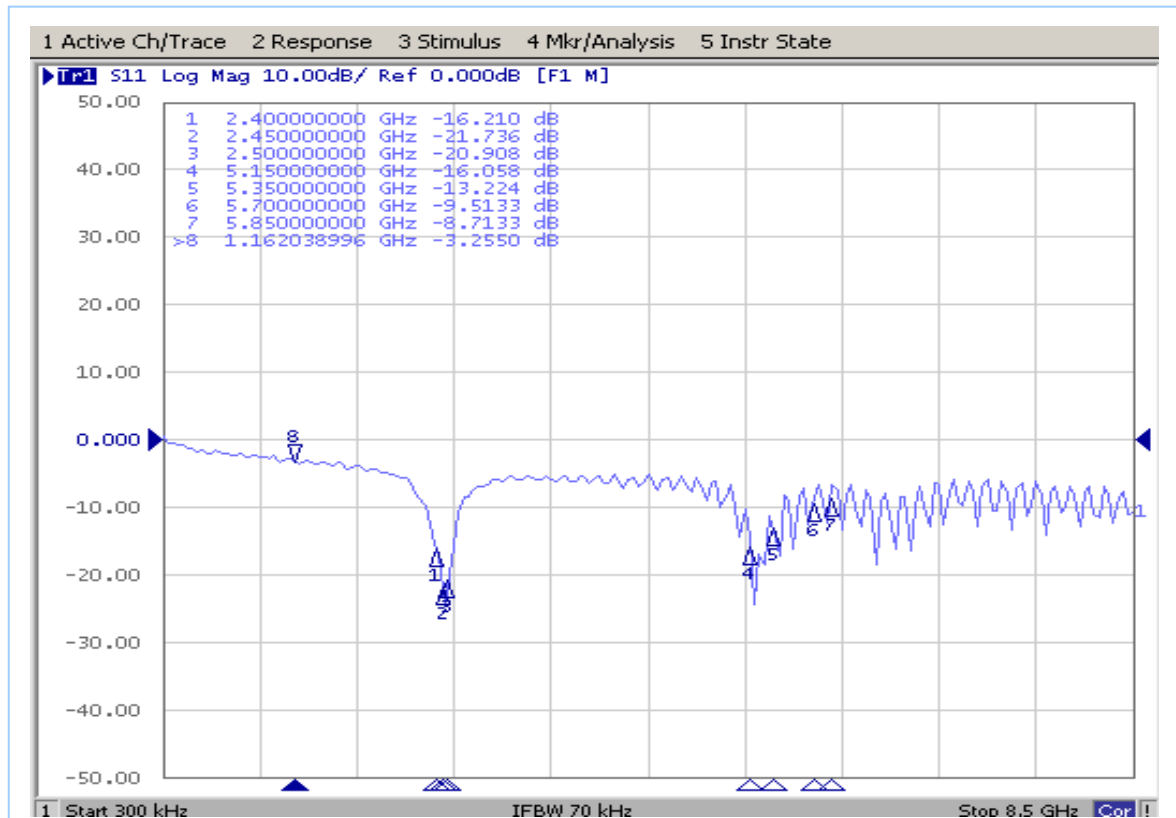
4.2 VSWR (2.4~2.5GHz)



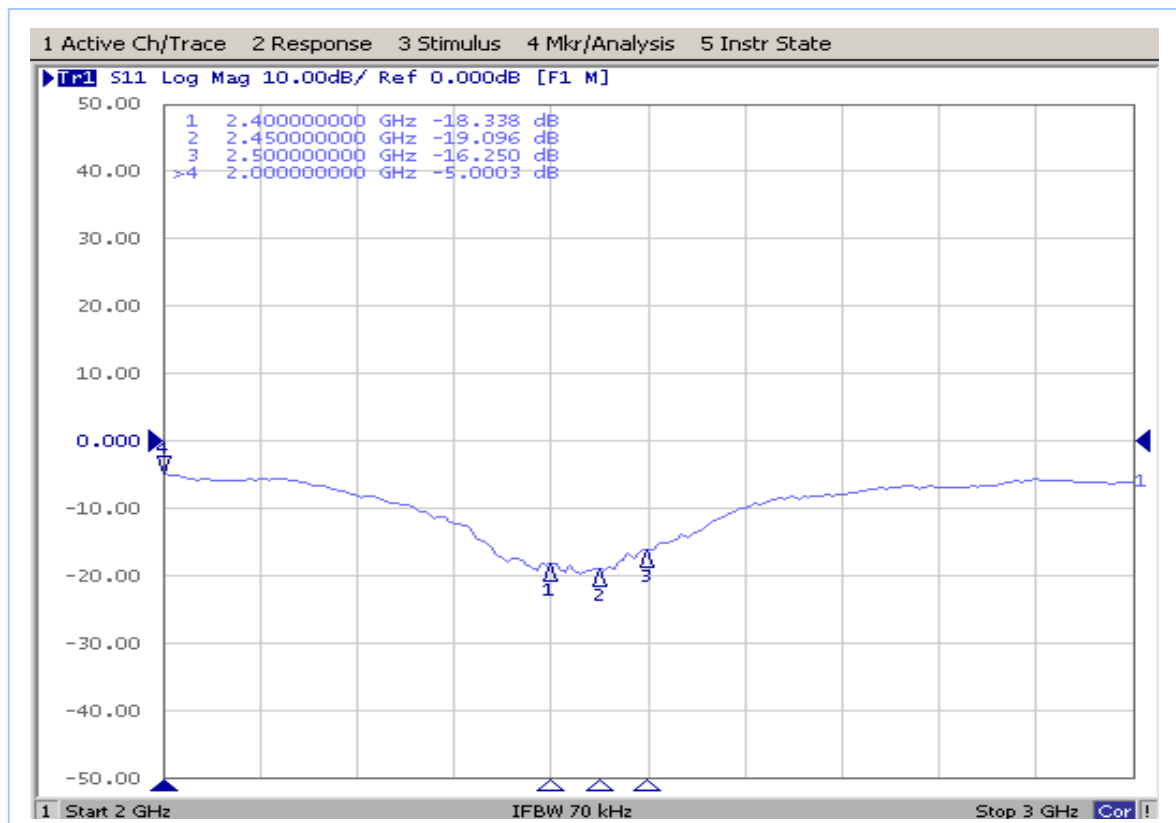
4.3 VSWR (5.15~5.35GHz)



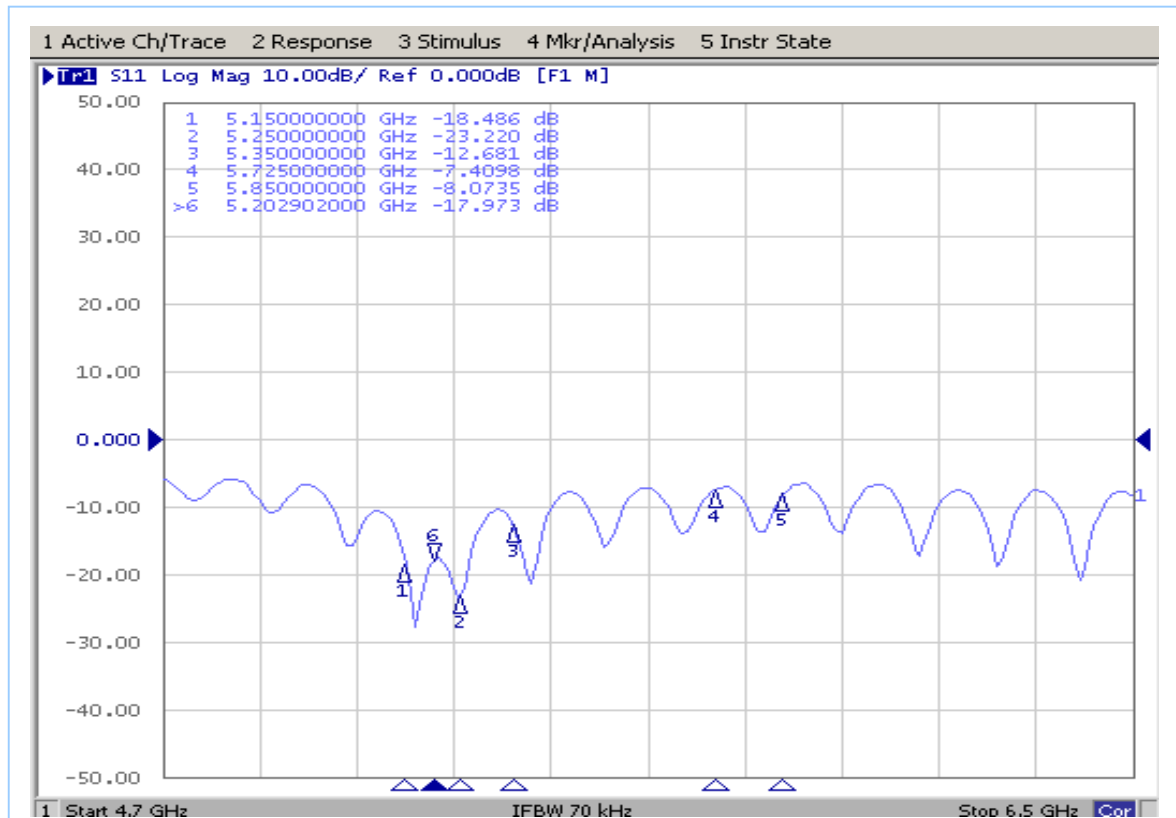
4.4 Return Loss (2.4~2.5GHz & 5.15~5.35GHz)



4.5 Return Loss (2.4~2.5GHz)

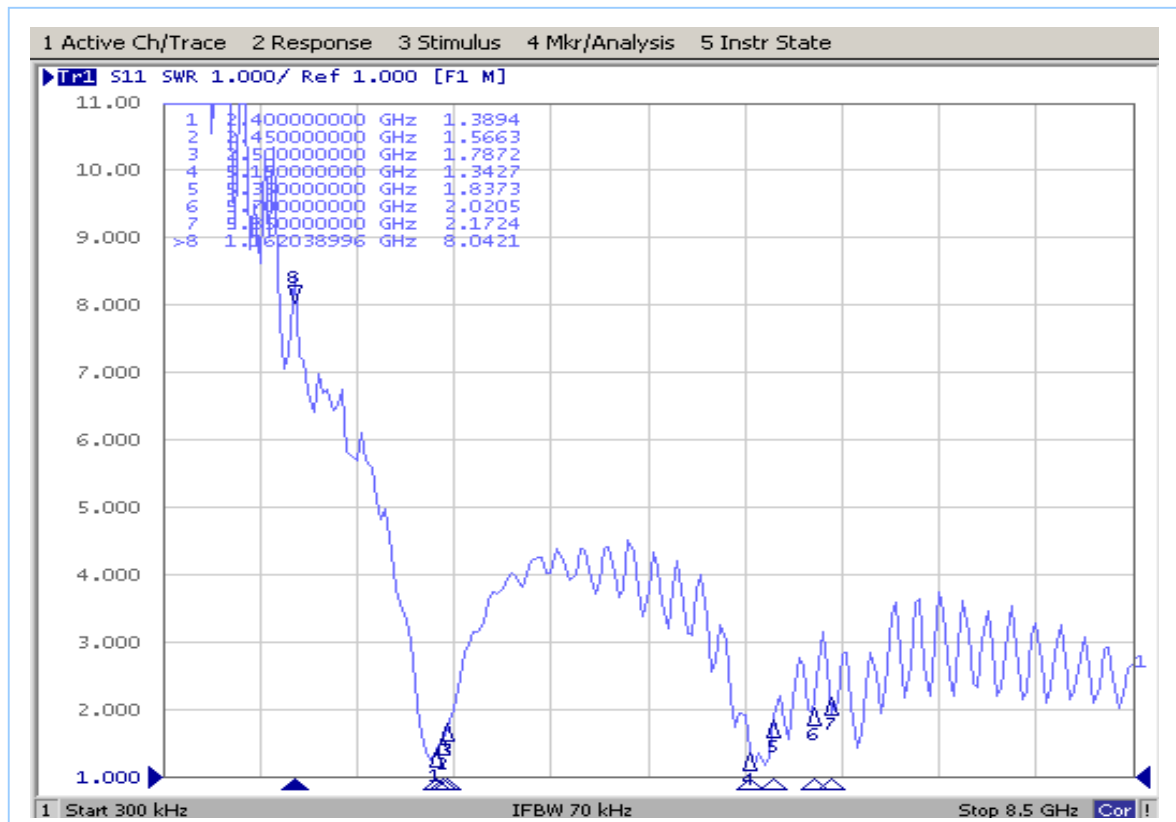


4.6 Return Loss (5.15~5.35GHz)

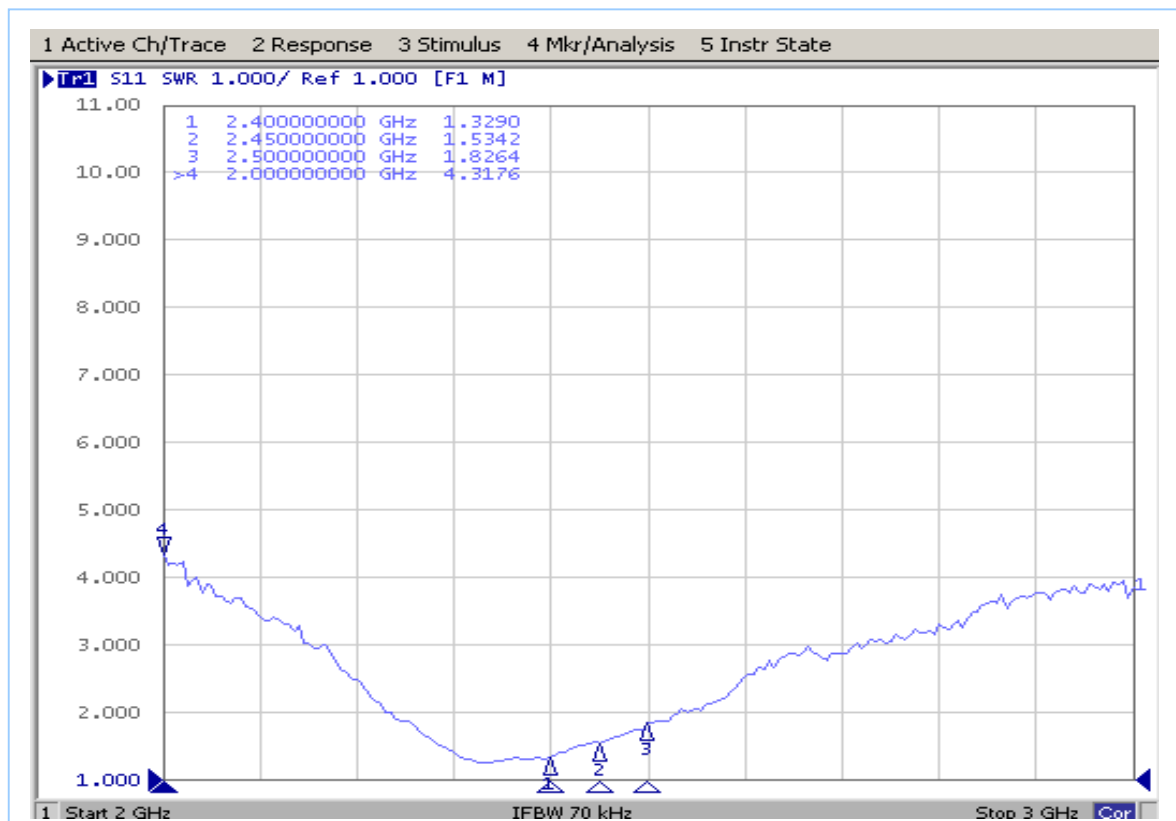


5. PIFA W/L ANT. / LCD TOP Right / 480mm / I-PEX & Kurabe / Black

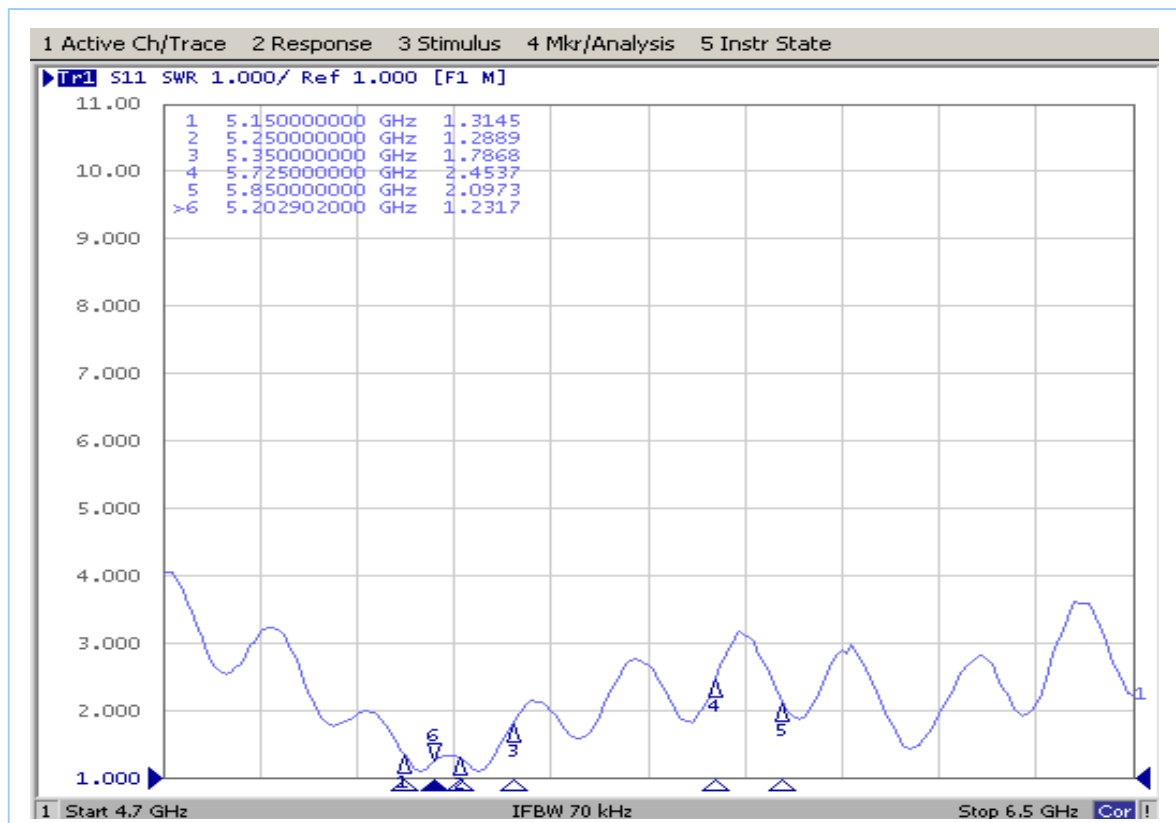
5.1 VSWR (2.4~2.5GHz & 5.15~5.35GHz)



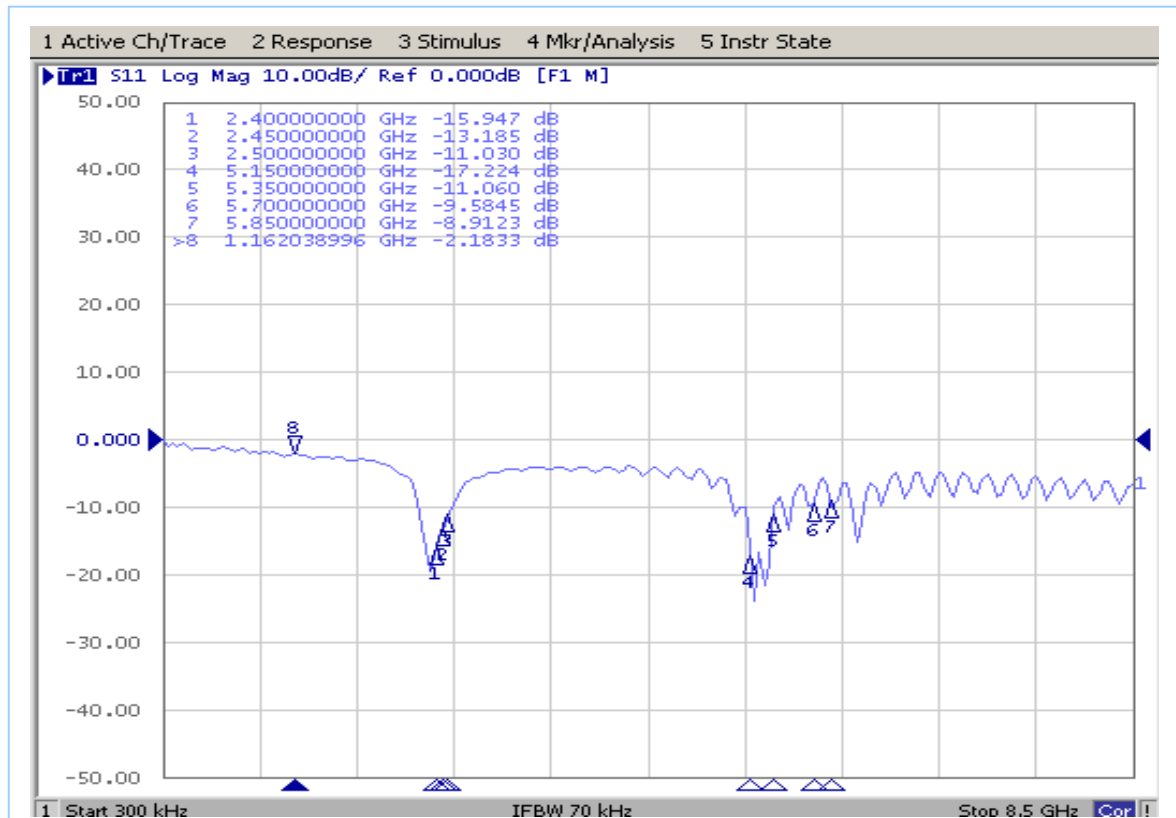
5.2 VSWR (2.4~2.5GHz)



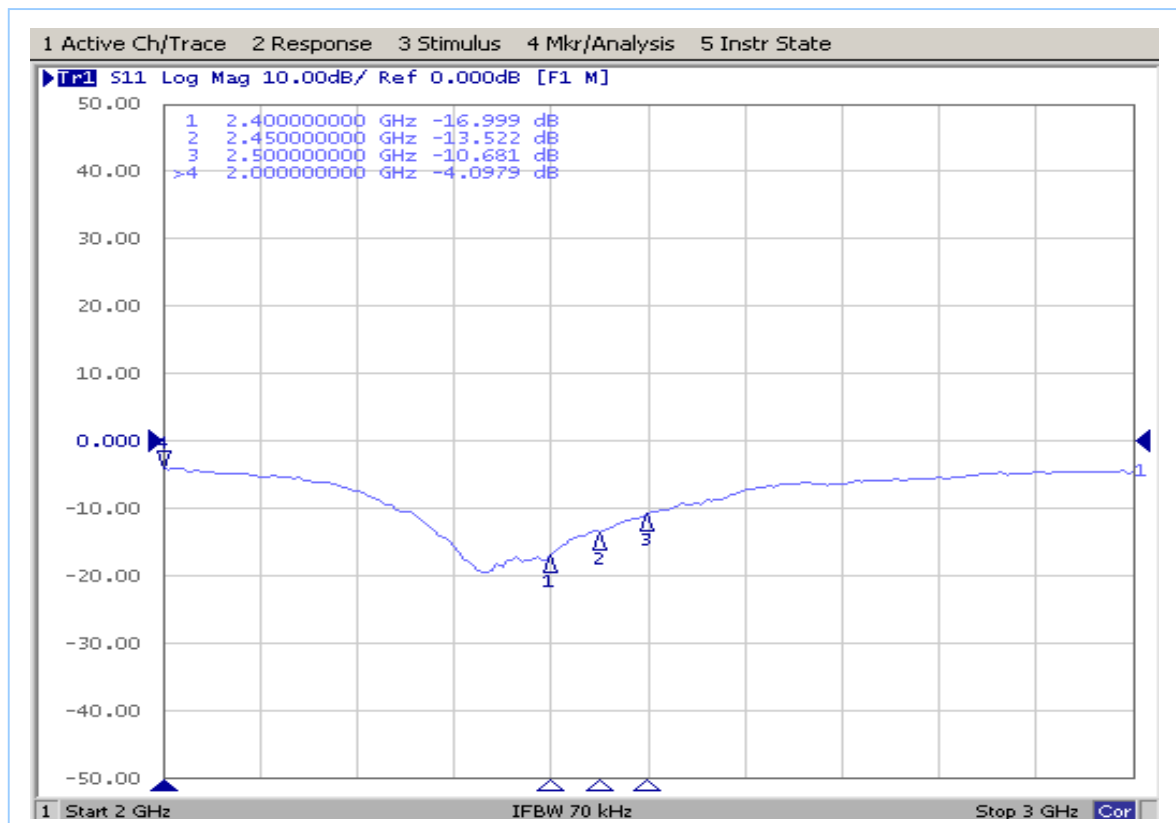
5.3 VSWR (5.15~5.35GHz)



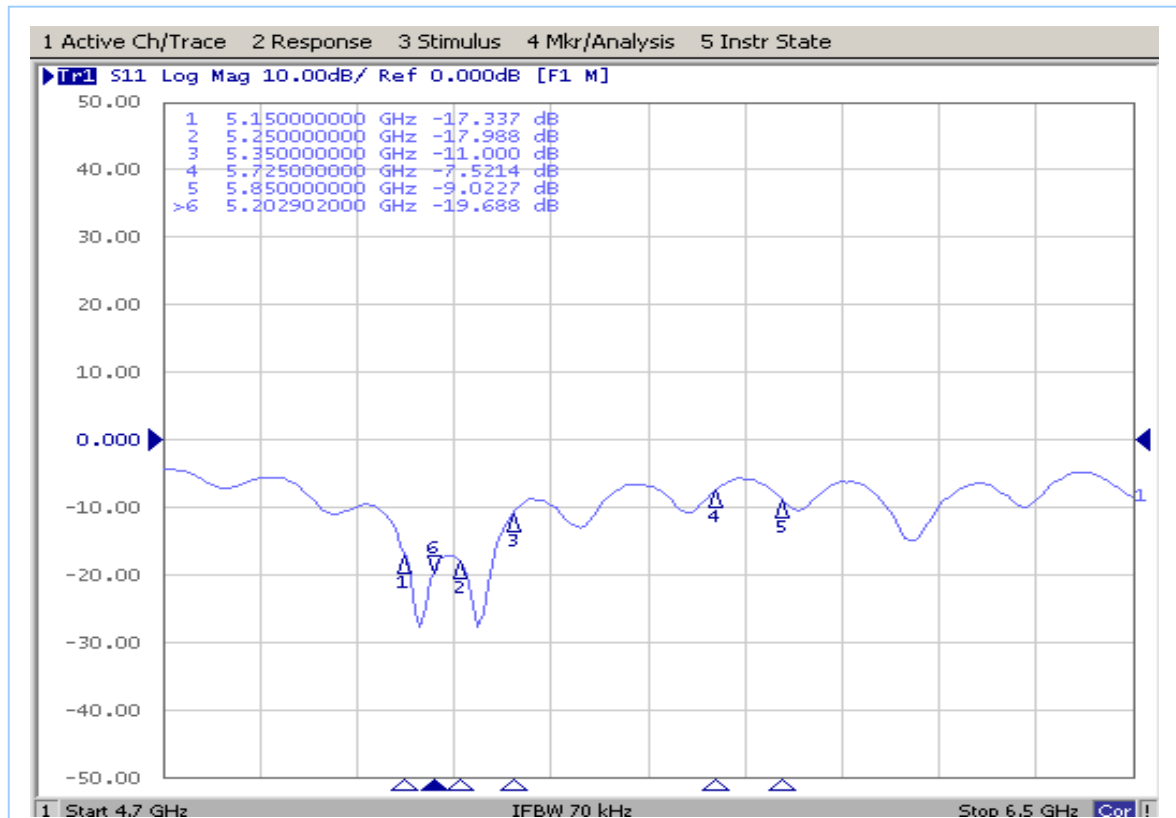
5.4 Return Loss (2.4~2.5GHz & 5.15~5.35GHz)



5.5 Return Loss (2.4~2.5GHz)

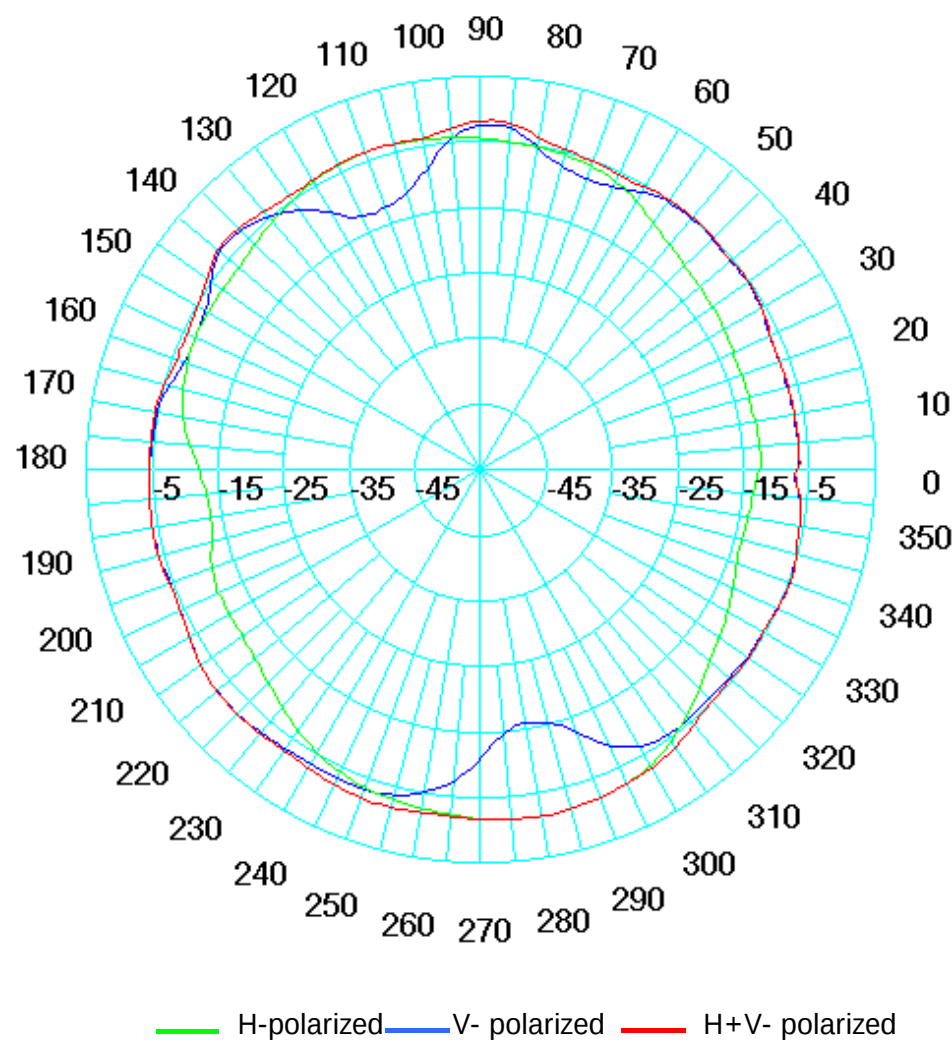


5.6 Return Loss (5.15~5.35GHz)



6. Gain & Pattern – W/L / PIFA ANT. For MH47

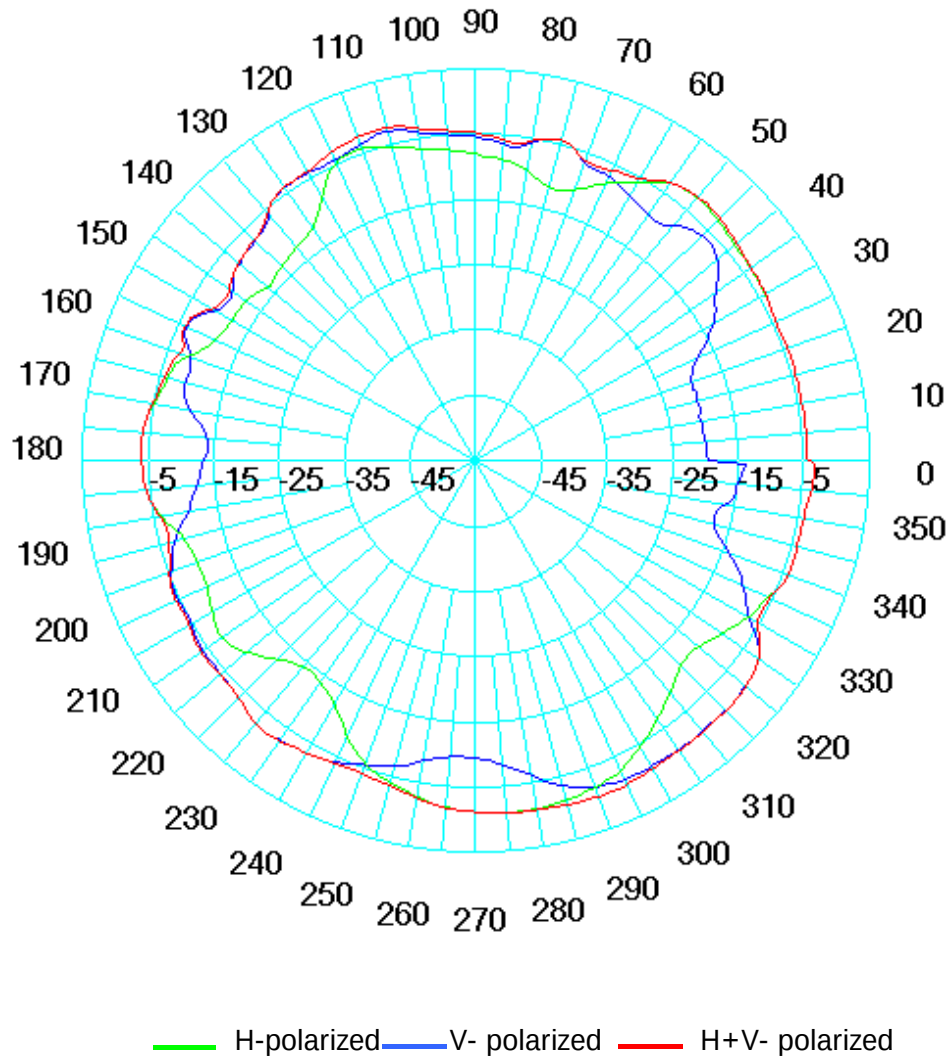
6.1 LCD Top Left / 688mm / 2.4~2.5GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		2.45GHz
PIFA	H	Peak	-1.37
		Avg.	-7.82
	V	Peak	-2.29
		Avg.	-6.11
	H + V	Peak	-1.37
		Avg.	-4.01
		% > -5dBi	68.98%

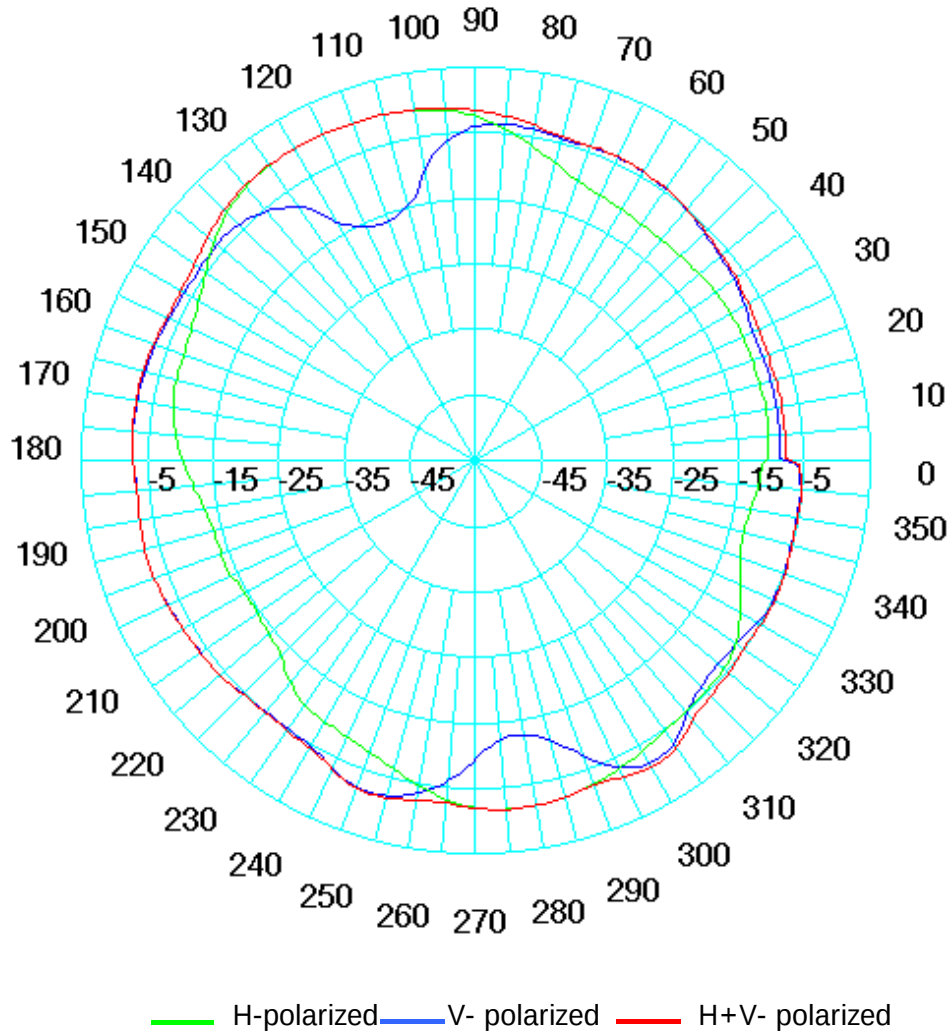
6.2 LCD Top Left / 688mm / 5.15 ~ 5.35GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		5.25GHz
PIFA	H	Peak	-0.88
		Avg.	-6.71
	V	Peak	-0.91
		Avg.	-7.74
	H + V	Peak	-0.22
		Avg.	-3.84
		% > -5dBi	76.73%

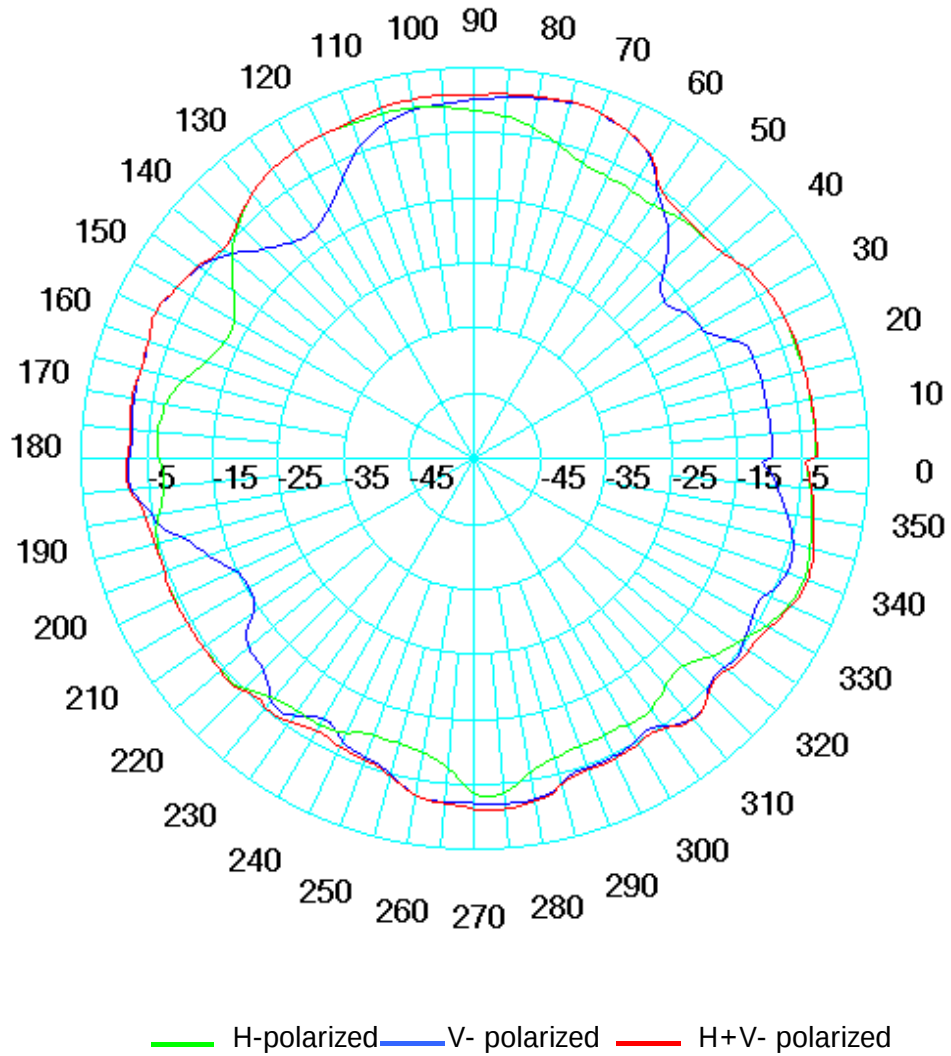
6.3 LCD Top Right / 480mm / 2.4~2.5GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		2.45GHz
PIFA	H	Peak	0.07
		Avg.	-7.51
	V	Peak	-1.76
		Avg.	-5.72
	H + V	Peak	0.07
		Avg.	-3.45
		% > -5dBi	80.06%

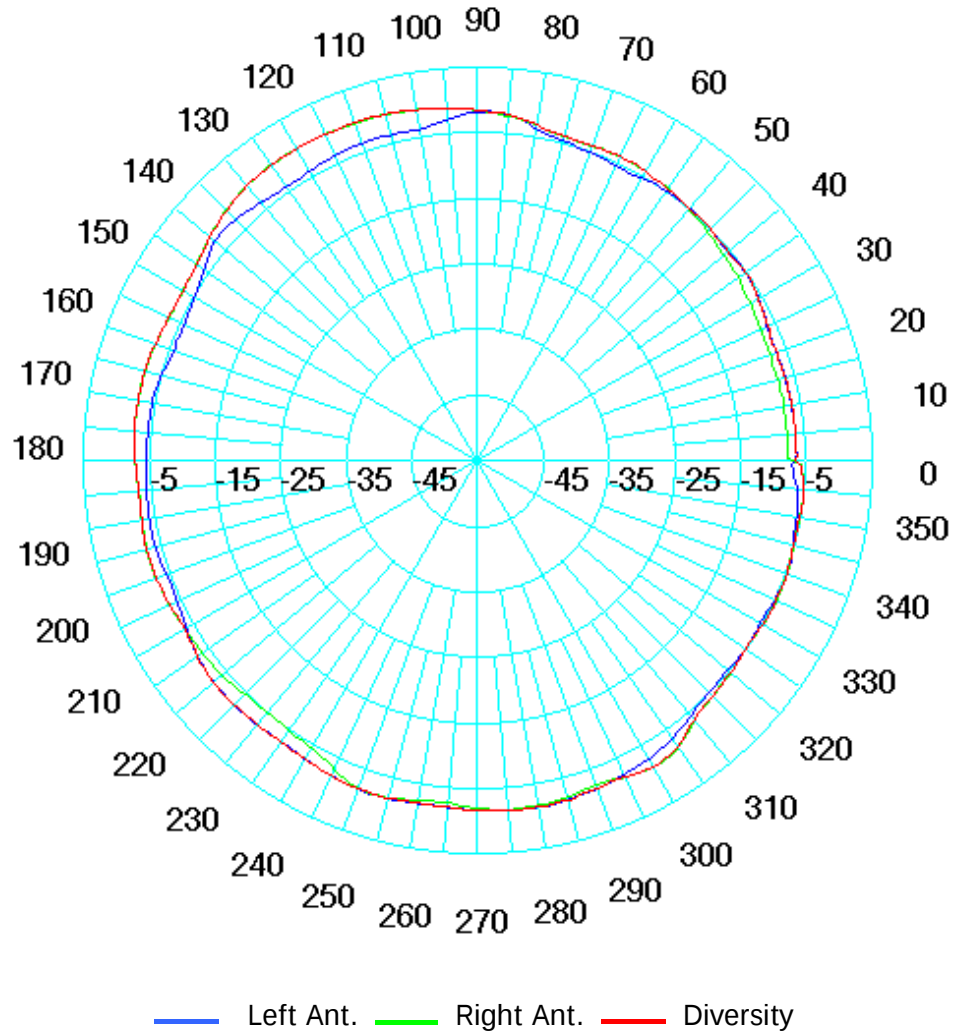
6.4 LCD Top Right / 480mm / 5.15 ~ 5.35GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		5.25GHz
PIFA	H	Peak	-0.11
		Avg.	-5.43
	V	Peak	1.68
		Avg.	-6.04
	H + V	Peak	1.76
		Avg.	-2.75
		% > -5dBi	86.43%

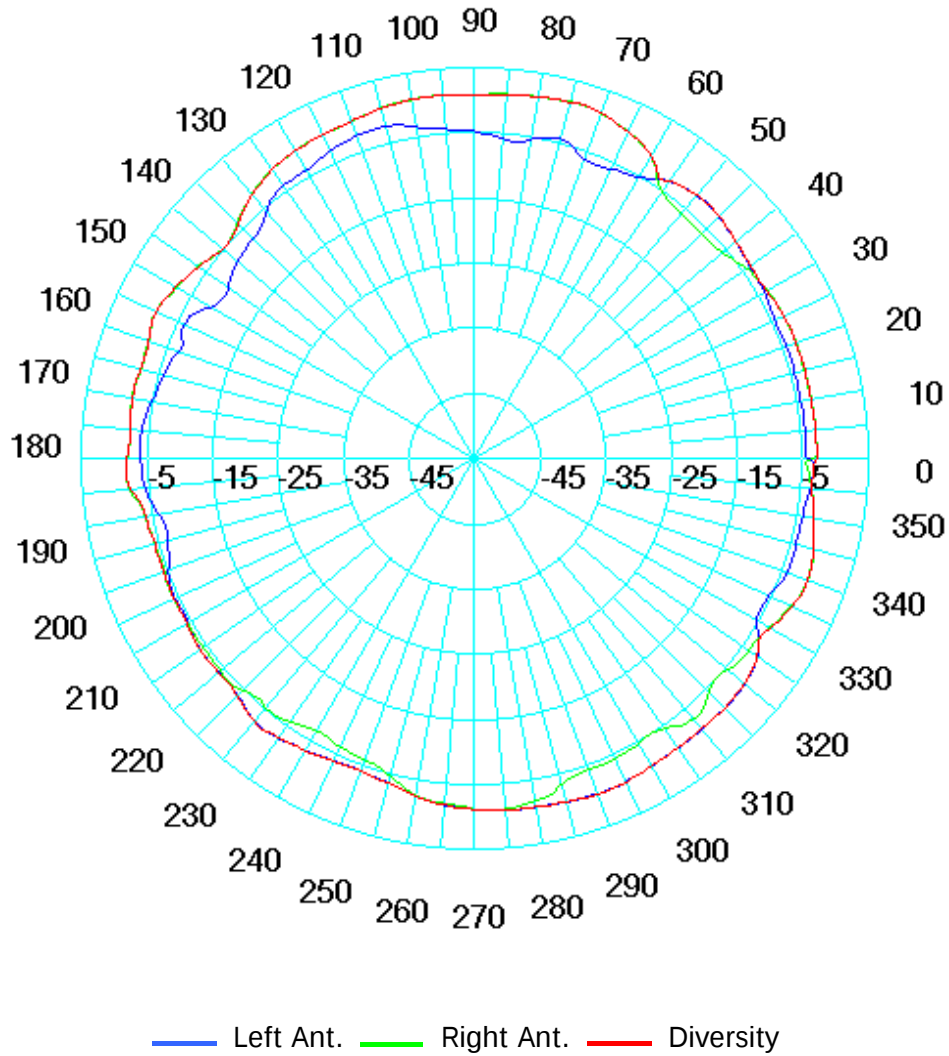
6.5 Diversity (2.4~2.5GHz)



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		2.45GHz
PIFA	Left	Peak	-1.37
		Avg.	-4.01
	Right	Peak	0.07
		Avg.	-3.45
	Diversity	Peak	0.39
		Avg.(Sum)	-2.07
		% -2.5dBi	64.27%

6.6. Diversity (5.15 ~ 5.35GHz)



Gain data

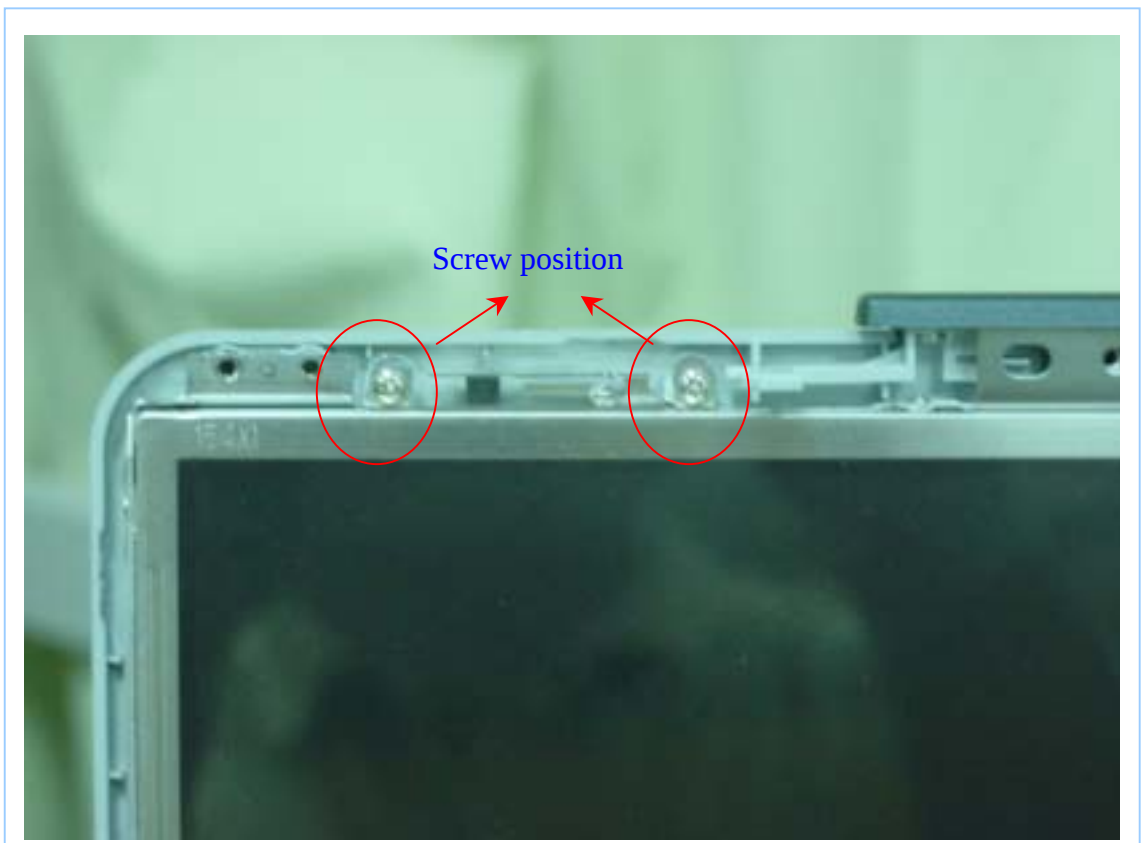
Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		5.25GHz
PIFA	Left	Peak	-0.22
		Avg.	-3.84
	Right	Peak	1.76
		Avg.	-2.75
	Diversity	Peak	1.88
		Avg.(Sum)	-1.27
		% -3.5dBi	95.29%

7. MH47 W/L ANT. Photo In Notebook

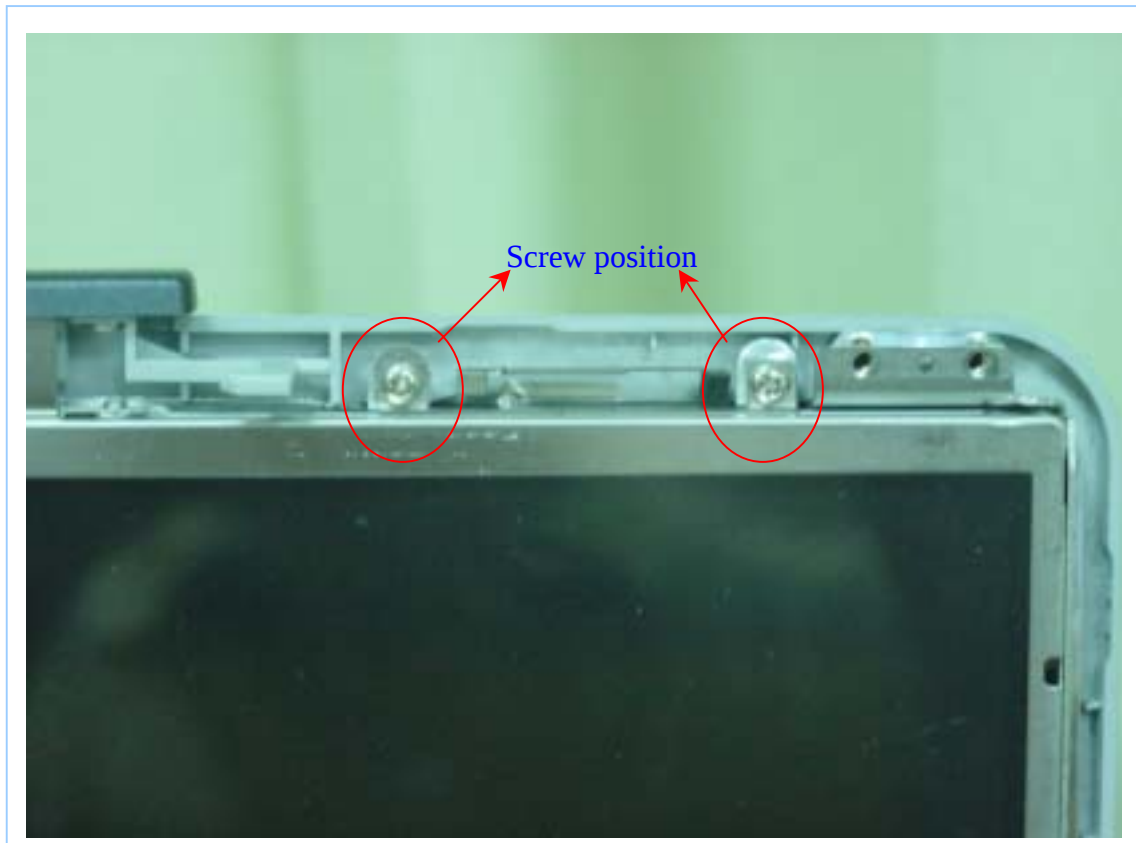
7.1. Zoom out



7.2 Lock manner(Left Top)



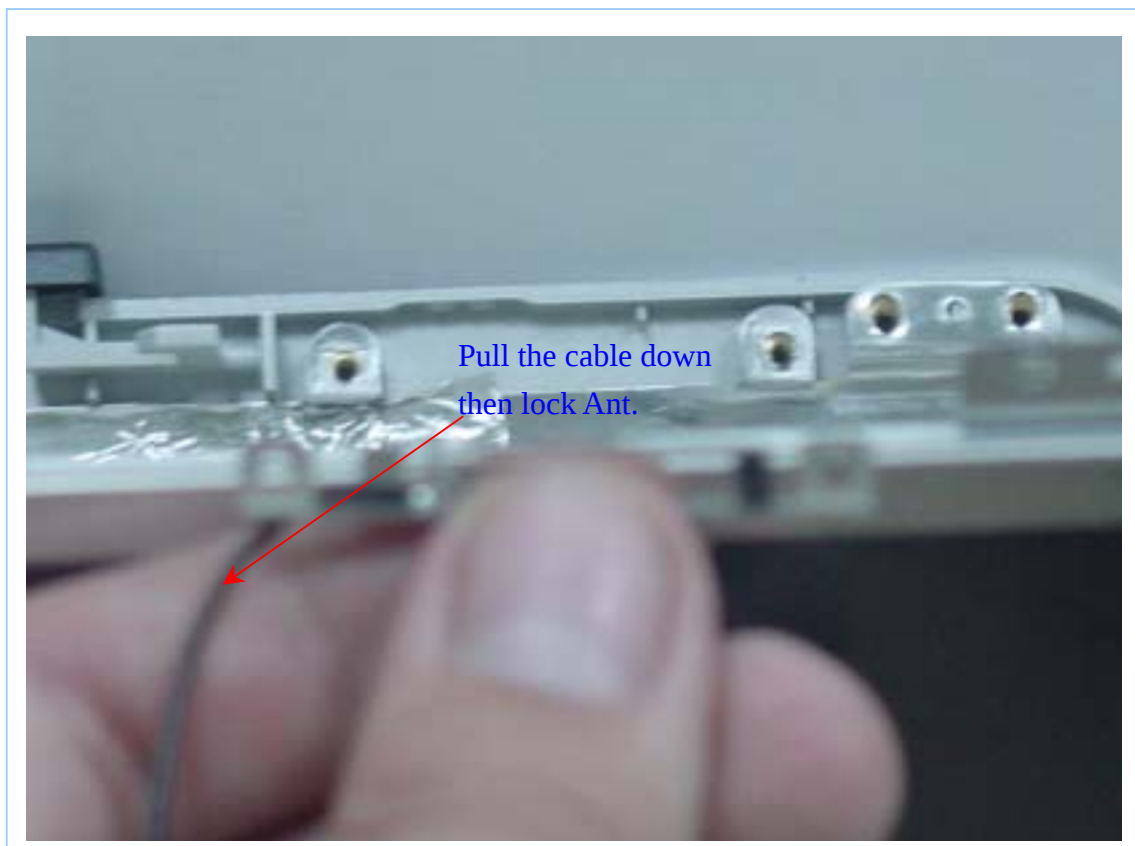
7.3 Lock manner(Right Top)



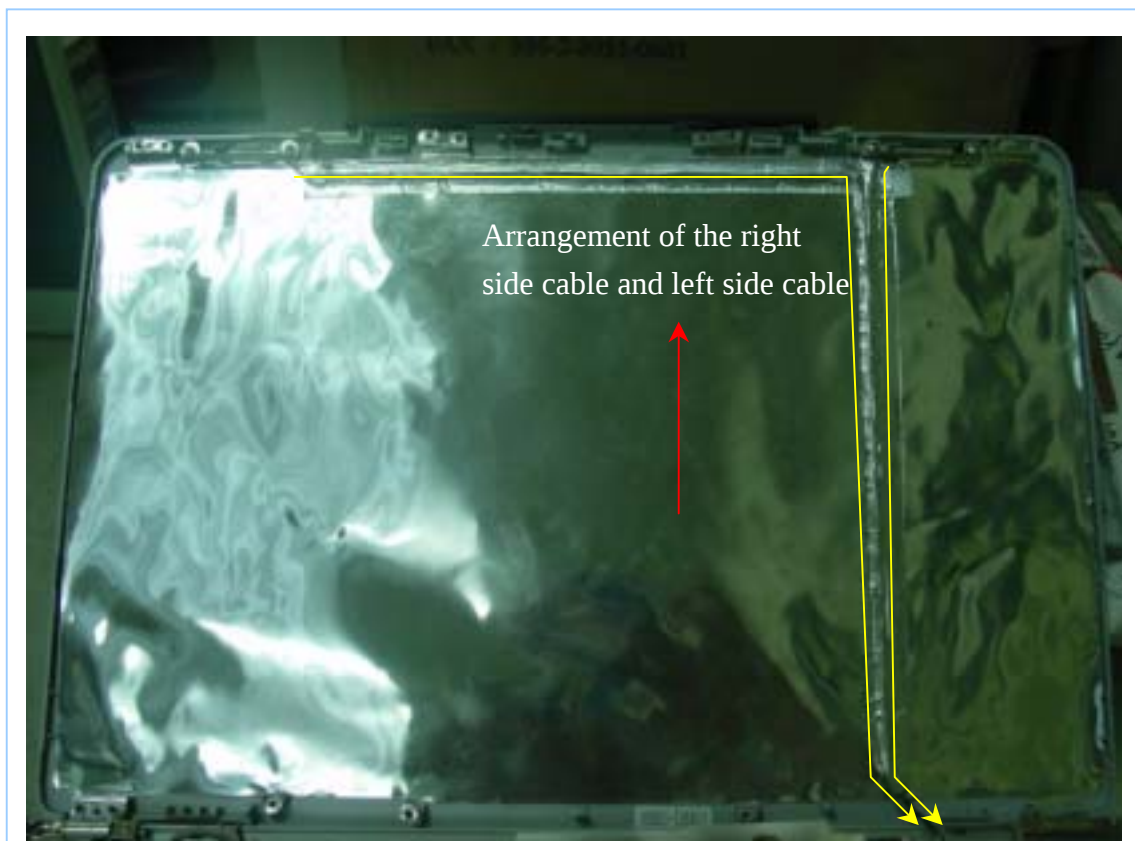
7.4 Install Antenna (Left Side)



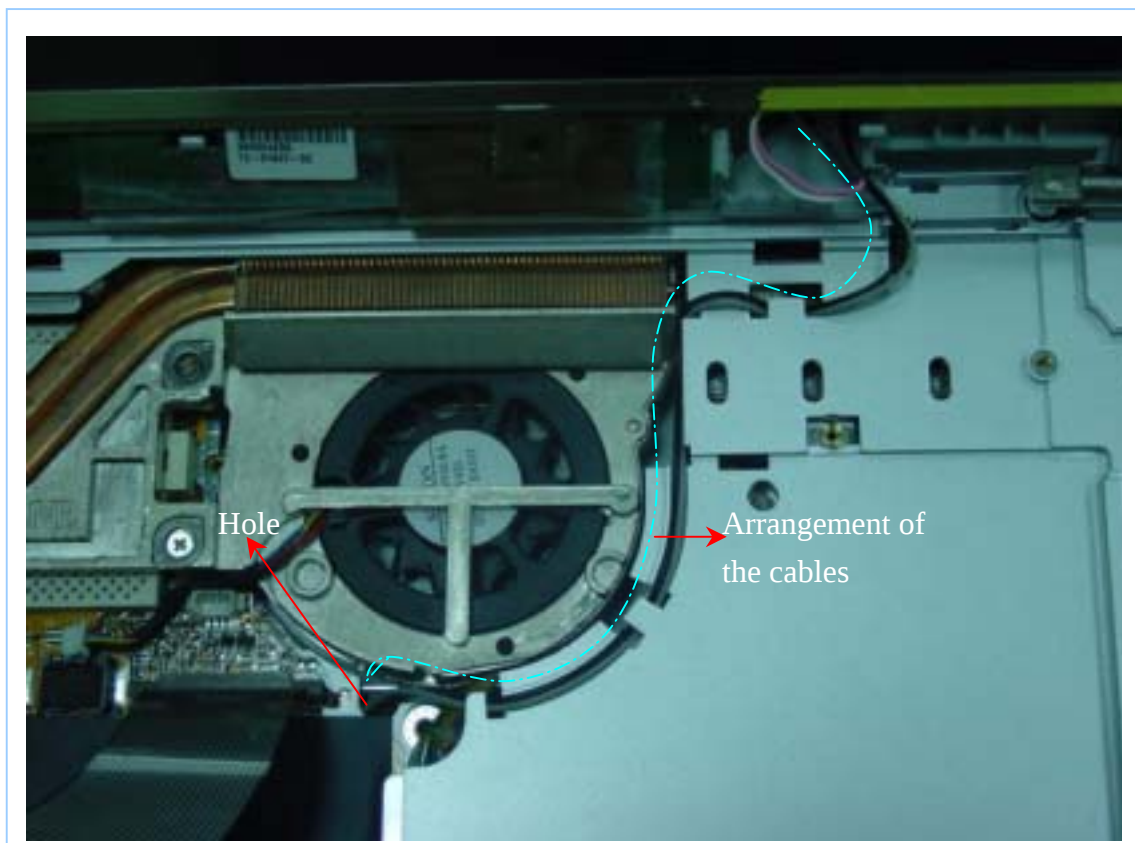
7.5 Install Antenna (Right Side)



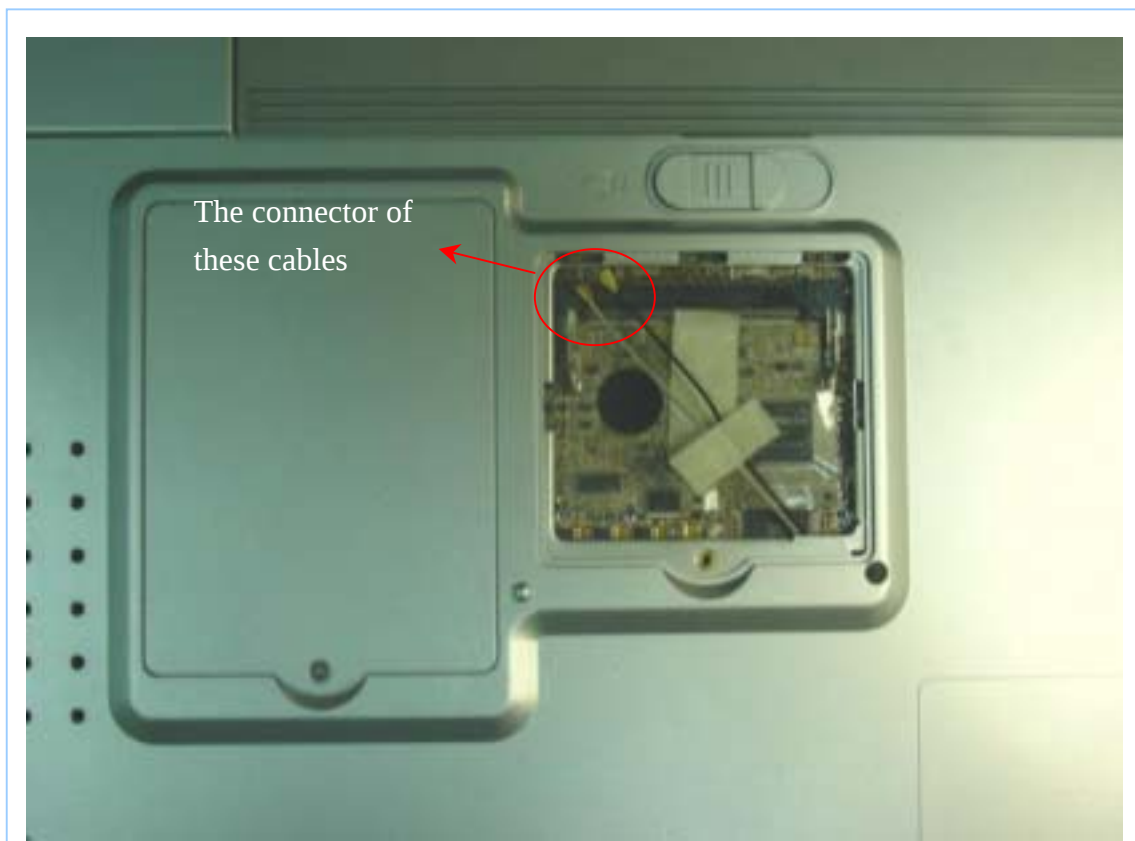
7.6 Direction of cable



7.7 Direction of cable



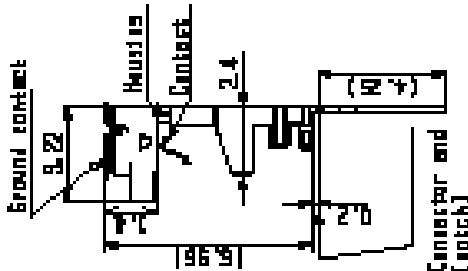
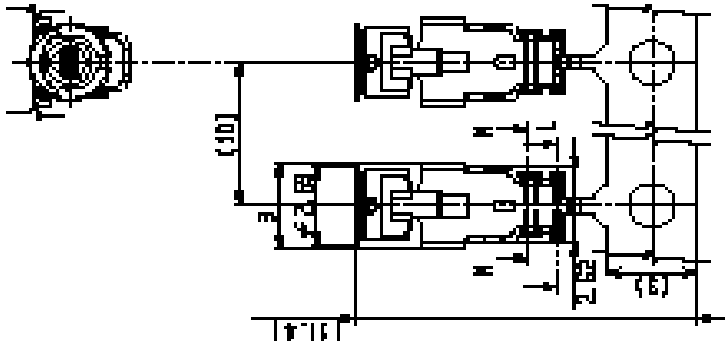
7.8 Photo of the connector



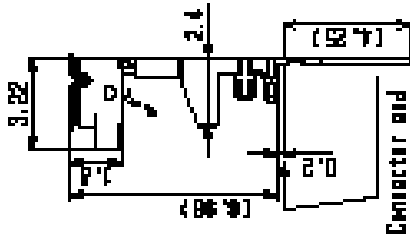
8. Document

8.1 Connector : I-PEX

PART NO.
20278-01R-00



Part No. 20278-01R-00
For hand tool
(with notch)



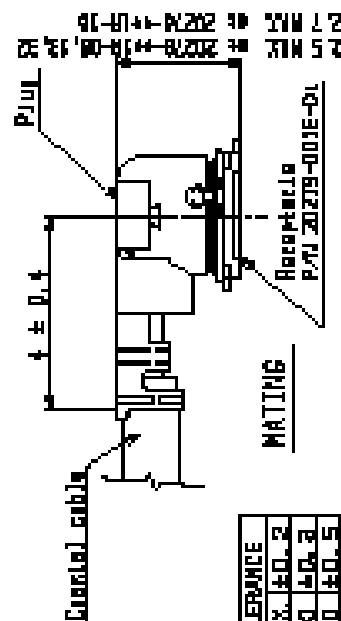
Part No. 20278-01R-00
For solder auto
termination machine
(without notch)

I-PEX Document and Release Certificate FORM 2002-0000										HF series ultra compact connector plug vertical									
TITLE										DATE									
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1. Material
 (1) Housing : PBT , UL94V-0 , black
 (2) Contact
 phosphor bronze
 gold plating
 (3) Brand Contact
 phosphor bronze - gold plating
 2. Packing : reel
 3. Mating partner part No.
 : 2029-001E-01

Diagram of the rear view of the connector. It shows a central cable with a diameter of 4N MAX. branching into two paths, each with a length of 2N MAX. The cable is terminated with a Plug and a Receptacle. The plug is labeled with a diameter of 4N MAX. The receptacle is labeled with a diameter of 4N MAX.

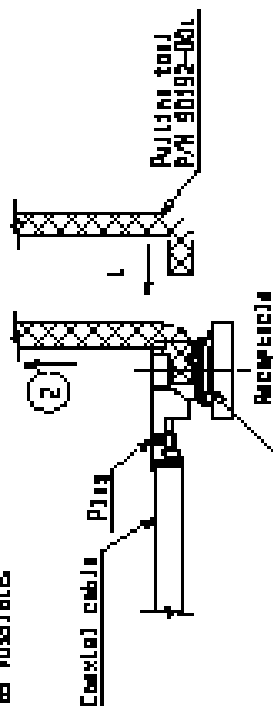
5-1 Wiring.
Please note the connector strictly to vertical direction as much as possible, adjusting the wiring axis of plug and receptacle.
As connector element angle setting may break the connector, please don't do it.



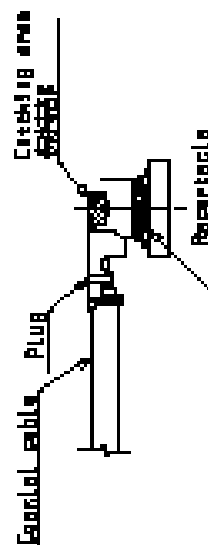
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第 5 章

【1】 抽気用圧縮機



(2) 子で「親」を敬ぶことは、
下で「上」を敬ぶことである。である
と、この世に「上」は無い、下もない。



DATE	I-PEX SCHWABER AND ASSOCIATES ENGINEERS ARCHITECTS					
DATE						
DATE	TITLE HIF audio store console) connector plus version)					
CUSTOMER	PROJECT NO.	DRAWING NO.	REV.	DATE	BY	CHKD.
HIGHWAY	70-100	70-100	-/-	2/22/78		
NOV 1978						

8.2 Coaxial Cable : KURABE

FROM : FADDY

PHONE NO. : 886 2 25427237

DEC. 19 2002 10:49AM P1

70-高頻電線
From: 張國高

KURABE INDUSTRIAL CO., LTD

SP3830M-X	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE (FWS 5022) UL 1979	PAGE	
PRODUCT —STANDARD		ISSUED	11-12-2001
		REVISED	18-3-2002

1. SCOPE

This standard covers "FEP insulated High-Frequency coaxial cable".

These cable are approved by UL as Style 1979 AWM (File E-46702)

[UL1979:105°C, 30V]

Use: Internal wiring of Class 2 Circuits of Electronic Equipment.

2. CONSTRUCTION

Construction and dimensions of the cable are shown in Figure.1 and Table 1.

3. PERFORMANCE

Performance of the finished cable is shown in Table 2. The test methods are in accordance with applicable test methods described in JIS C 3005.

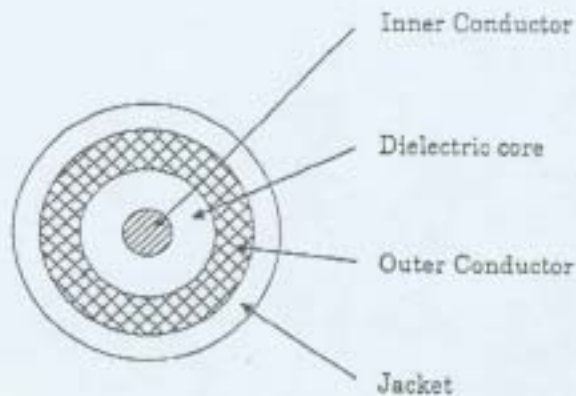


Figure 1.

NOTE:

MADE BY

APPROVALS

S. Aki

T. Kamei

KURABE INDUSTRIAL CO., LTD

SP3830M-X	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE (FWS 5022) UL 1979	PAGE	
PRODUCT STANDARD		ISSUED	11-12-2001
		REVISED	18-3-2002

Table 1. Construction

Item	Unit	Specified Value
Inner Conductor	Material	Silver coated annealed copper wire
	Stranding	No./mm
	Dis.(approx.)	7/0.08
Dielectric Core	Material	FEP
	Thick.(nom.)	mm
	Dis.	mm
	Color	Natural
Outer Conductor	Material	Silver coated annealed copper wire
	Type	Braid (16/4/0.05)
	Dis.(approx.)	mm
		0.93
Jacket	Material	FEP
	Thick.(nom.)	mm
	Dis.	mm
	Color	Standard colors are white, black, blue, brown, and gray.

Table 2. Performance

Item	Unit	Specified Value	Note
Appearance	—	Faultless in visible	—
Inner conductor resistance	Ω/km	Max.597	at 20°C
Insulation resistance	$M\Omega \cdot \text{km}$	Min.1500	at 20°C
Dielectric strength	—	Dielectric core: No breakdown at AC1.5kV for 0.15sec.	Spark test
		Jacket: No breakdown at AC1.5kV for 0.15sec.	Spark test
		No breakdown at AC500V for 1min.	Outer conductor to inner conductor
Heat resistance for solder	—	Shrink or expansion of dielectric core are not more than 0.5mm	※
Capacitance	pF/m	nom. 98	at 1kHz
Characteristic impedance	Ω	50±2	TDR method
Attenuation (nom.)	dB/m	2.0	1.0GHz
		2.9	2.0GHz
		3.6	3.0GHz
		4.2	4.0GHz
		4.7	5.0GHz
		5.2	6.0GHz

※ After immersion of dielectric core, 10mm into soldering pot which is 255°C ± 5°C for 5 seconds, shrinkage or expansion of the dielectric core must not exceed 0.5mm.

NOTE:

MADE BY

APPROVALS

T. Sakai

T. Kozuma

포항종합제철주식회사
POHANG IRON & STEEL CO., LTD.
(INCORPORATED IN KOREA)

증명서...번호 : 991223-CEK-010-001
 CERTIFICATE NO :
 발행 일자 :
 DATE OF ISSUE : DEC. 23. 1999

주요 자	SEAME TRADING CO. LTD
주물 자	SEAMSTONE CORPORATION
CUSTOMER	
SUPPLIER	

제 약 번 호	CONTRACT NO	87F3C2FA
주 문 번 호	ORDER NO	873-890700
물 품 명	COMMODITY	TIN PLATE COIL
제 품 규 격	SPECIFICATION	JISG3303 SPT3-M073

[illegible]

8.4 TUBE : RAYCHEM

886-2-22183103 FAVORTRON CO. LTD.

219 P01 SEP 28 '03 09:5

Raychem

- Low recovery temperature
- Environmentally friendly
- Highly flame-retardant
- Very flexible
- General purpose

Raychem's Versafit heat-shrinkable tubing is a cost-effective, environmentally friendly choice for many commercial applications. Versafit tubing is made from a specially formulated, crosslinked polyolefin with low recovery temperature, excellent flexibility, and high flame-retardance (VW-1).

Unlike other typical flame-retardant tubings, new Versafit tubing is free of polybrominated biphenyls (PBBs) and polybrominated biphenyl oxides (PBBOs). In Europe, these chemicals are classified as environmentally hazardous substances.

Compared to noncrosslinked materials, Versafit tubing has a higher temperature rating and exhibits better thermal stability and resistance to physical abuse.

Versafit tubing performs a variety of functions in commercial applications:

- Electrically insulates and protects in-line components, disconnect terminals, and splices.
- Bundles wires for very flexible light-duty harnesses.
- Strain-relieves electrical wire connections for long-term reliability.
- Identifies or color-codes wires, cables, terminals, and components.

Thermofit Versafit

Metric-sized heat-shrinkable tubing



Versafit tubing offers a faster, easier, more reliable replacement for molding in place, dip coating, and tape wrapping.

Versafit products are: UL Recognized and CSA Certified at 125°C, 600 V, with UL VW-1 and CSA OFT flame-retardancy ratings.

Temperature rating

Full-recovery temperature	90°C
Continuous operating temperature	-45°C to 125°C

Specifications

Type	Raychem	UL	CSA
Versafit	RT-1136	E35586 VW-1	LR31929 OFT

Note: When ordering, always specify latest issue.

Dimensions (millimeters)



Size	As supplied		After shrinkage	
	Inside diameter	Wall thickness (nominal)	Inside diameter (max.)	Wall thickness (min.)
1.0/0.5	1.6 ±0.2	0.2	0.5	0.33
1.5/0.75	2.1 ±0.2	0.2	0.75	0.35
2.0/1.0	2.6 ±0.2	0.25	1.0	0.43
2.5/1.25	3.1 ±0.2	0.25	1.25	0.43
3.0/1.5	3.6 ±0.2	0.25	1.5	0.43
3.5/1.75	4.1 ±0.3	0.25	1.75	0.43
4.0/2.0	4.6 ±0.3	0.25	2.0	0.43
5.0/2.5	5.6 ±0.3	0.3	2.5	0.56
6.0/3.0	6.6 ±0.3	0.3	3.0	0.56
7.0/3.5	7.6 ±0.3	0.3	3.5	0.56
8.0/4.0	8.6 ±0.3	0.3	4.0	0.56
9.0/4.5	9.6 ±0.3	0.3	4.5	0.56
10.0/5.0	10.4 ±0.3	0.3	5.0	0.56

Size	As supplied		After shrinkage	
	Inside diameter	Wall thickness (nominal)	Inside diameter (max.)	Wall thickness (min.)
11.0/5.5	11.4 ±0.3	0.3	5.5	0.56
12.0/6.0	12.9 ±0.3	0.3	6.0	0.56
13.0/6.5	13.5 ±0.3	0.35	6.5	0.66
14.0/7.0	14.4 ±0.4	0.35	7.0	0.68
15.0/7.5	15.7 ±0.4	0.35	7.5	0.68
16.0/8.0	16.9 ±0.4	0.35	8.0	0.68
18.0/9.0	19.0 ±0.4	0.4	9.0	0.76
20.0/10.0	21.4 ±0.4	0.4	10.0	0.76
22.0/11.0	23.2 ±0.4	0.45	11.0	0.89
25.0/12.5	26.8 ±0.4	0.45	12.5	0.89
27.0/12.5	28.2 ±0.5	0.45	12.5	0.89
28.0/14.0	30.0 ±0.5	0.45	14.0	0.89
30.0/15.0	32.1 ±0.5	0.45	15.0	0.89

Ordering information

Colors	Standard Black Nonstandard Red, blue, yellow, green, white, orange, brown, violet, gray
Size selection	Always order the largest size that will shrink snugly over the component being covered. A variety of special order sizes are available.
Standard packaging	On spools
Marking	Marked with UL/CSA legends.
Ordering description	Specify product name, size, and color; for example, Versafit-2.0/1.0-0 (0=black)

Raychem specification values

	Property	Unit	Requirement	Method of test
Physical	Dimensions	mm	See reverse	ASTM D 2671
	Longitudinal change: ASTM D 2671	percent	+1, -5	ASTM D 2671
	UL 224	percent	+3, -3	UL 224
	Eccentricity	percent	30 maximum	ASTM D 2671
	Tensile strength	psi (MPa)	1500 (10.3) minimum	ASTM D 2671
	Ultimate elongation	percent	200 minimum	ASTM D 2671
	Secant modulus (as supplied)	psi (MPa)	1.5 x 10 ⁴ (103) maximum	ASTM D 2671
	Deformation at 125°C (257°F)	percent	50 maximum	UL 224
	Low-temperature flexibility (1 hour at -45°C/-22°F)		No cracking	UL 224
	Heat shock (1 hour at 136°C/277°F)		No cracking	UL 224
	Heat aging (7 days at 158°C/316°F)			UL 224
	Followed by tests for:			
	Tensile strength	psi (MPa)	70% minimum of original	UL 224
	Ultimate elongation	percent	100 minimum	UL 224
	Flexibility		No cracking	UL 224
	Dielectric withstand at 2500 V	seconds	60 minimum	ASTM D 2671
	Dielectric breakdown	volts	50% min. of unaged specimens	ASTM D 2671
	Dielectric strength	volts/mil (kV/mm)	500 (19.7) minimum	ASTM D 2671
	Restricted shrinkage		Pass	UL 224
Electrical	Dielectric withstand at 2500 V	seconds	60 minimum	ASTM D 2671
	Dielectric strength	volts/mil (kV/mm)	500 (19.7) minimum	ASTM D 2671
	Volume resistivity	ohm-cm	10 ¹⁴ minimum	ASTM D 2671
Chemical	Corrosive effect (7 days at 158°C/316°F)		No corrosion	ASTM D 2671 Procedure B
	Copper stability (7 days at 158°C/316°F)		No brittleness, glazing, cracking, or severe discoloration of tubing. No pitting or blackening of copper.	ASTM D 2671 Procedure B
	Followed by test for:			
	Ultimate elongation	percent	100 minimum	ASTM D 2671
	Flammability		Pass	UL 224, VW-1

Note: Consult RT-1135, Issue 7 for specific details about test procedures and full list of properties.

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Thermofit Systems Division
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Menlo Park, California 94025-1100
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